

# NATIONAL BUREAU OF STANDARDS REPORT

## NBS PROJECT

0201-30-2303

0201-30-2328

## NBS REPORT

March 31, 1954

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## IMPROVEMENT OF VISUAL AIDS FOR AIR NAVIGATION

Progress Report  
July 1, 1953 to February 28, 1954

Prepared by  
F. C. Breckenridge

To  
Airways Engineering Division  
Civil Aeronautics Administration

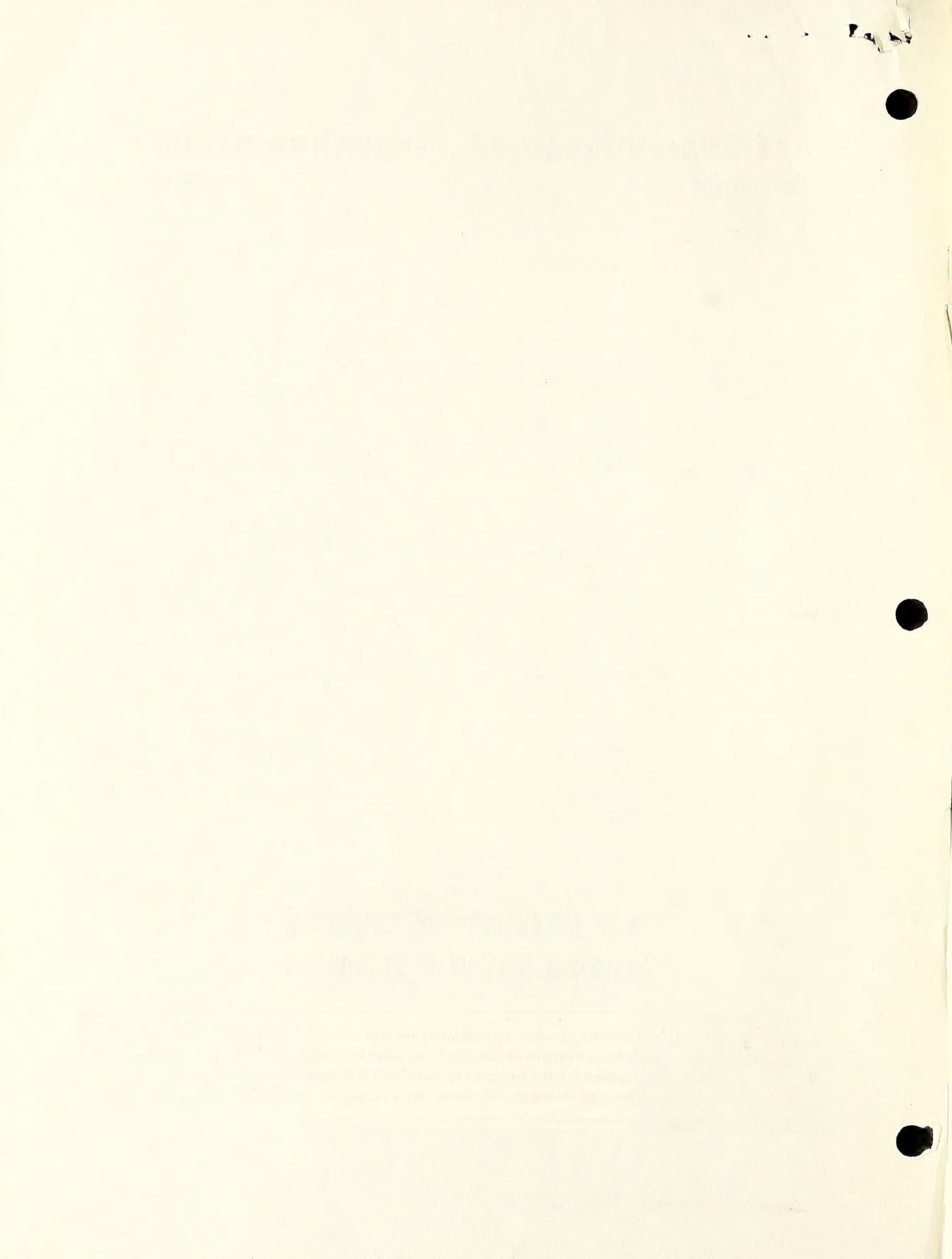


## U. S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS

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IMPROVEMENT OF VISUAL AIDS FOR AIR NAVIGATION  
PROGRESS REPORT

1. OBJECTIVES

It is the purpose of this project to carry on research and testing, develop specialized equipment and provide consultation services for the Airways Engineering Division of the Office of Federal Airways, Civil Aeronautics Administration.

2. STATUS

At the beginning of the period covered by this report, all of the research activities and three of the tests covered by this report were in progress. At the close of the period two of the research activities were nearing completion, and there was only one uncompleted test pending. The work covered by this report is financed by two separate funds, and hence two N.B.S. project numbers appear on the title page. A separate financial summary is attached covering the charges against each of these funds.

3. GOVERNMENT TESTS

The tests reported in this division of the report were made by personnel other than those regularly assigned to the C.A.A. projects. With one exception they are standard tests which could be covered by simple reports. A brief summary of these tests follows:

<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
G13593	6-18-53	7-21-53	\$100.	\$100.

A fuel oil additive carrying the trade name "GO-Sludge" was analyzed and found to be essentially a mixture of soluble oil of petroleum origin and alcohols. As the result of this analysis it was agreed that it would not be worth the expense to test the material further.

G13887      Test Canceled

This number was assigned to a propeller test which was canceled after preliminary conferences because there were no funds available to cover the work.

G14096	9-11-53	10-6-53	\$200/\$400*	\$386.
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A field intensity meter was submitted for calibration at 118 megacycles. Later, it was decided that the meter should be calibrated at 109 and 333 megacycles also. Still later, it was requested that the meter be calibrated at 30 megacycles which required special arrangements. Difficulty was experienced in checking the linearity of the meter, but a satisfactory calibration was finally obtained.

\*Increased to cover additional work.



<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
014807	1-6-54	2-1-54; & 3-2-54	--	-- *

Nineteen parts from a PAR 56 lamp holder were examined spectrochemically to determine if they complied with C.A.A. specifications. Some of the parts did not comply, notably the principal casting. Additional tests were made on successive samples until satisfactory parts were tested.

\* Charged to a separate account but included because no separate report will be made for that account.

014868	1-6-54	1-29-54	\$150.	\$29.
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A connector assembly for a PAR 56 lamp holder was tested to determine if it could withstand the required voltages. The results were satisfactory.

014950	1-15-54	2-12-54	\$50.	\$61.
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A radio-frequency cavity meter was calibrated at six frequencies and the meter setting at resonance was recorded and reported.

014952	1-27-54	2-25-54	--	-- *
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A cable clamp was tested by spectrochemical analysis to determine if it conformed with the requirements of the specification. The clamp was in three parts, two of which met the requirements completely but the third part was considerably low in magnesium.

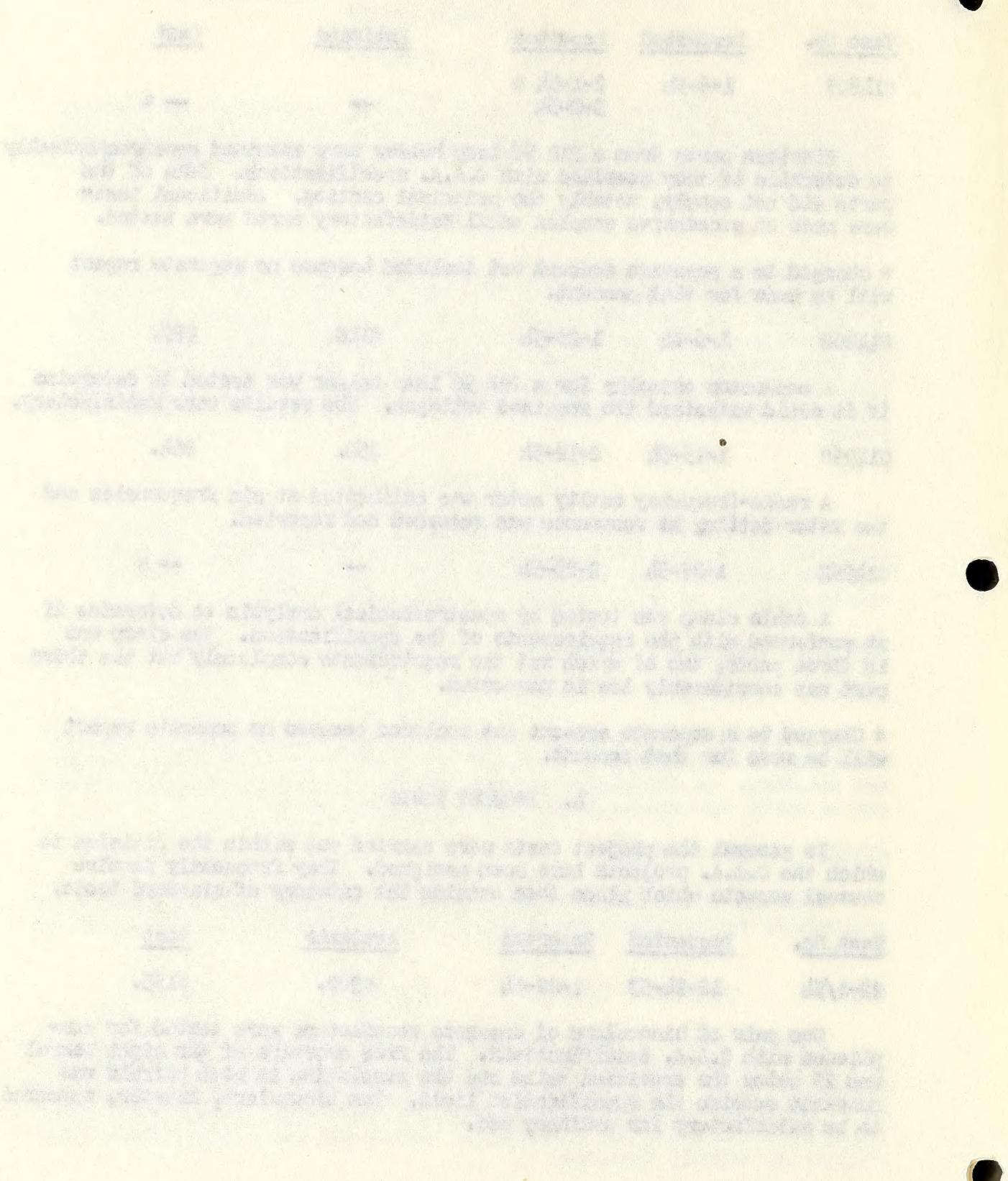
\* Charged to a separate account but included because no separate report will be made for that account.

#### 4. PROJECT TESTS

In general the project tests were carried out within the Division to which the C.A.A. projects have been assigned. They frequently involve unusual aspects which place them outside the category of standard tests.

<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
22-1/54	12-21-53	2-22-54	\$300.	\$155.

One pair of binoculars of Japanese manufacture were tested for compliance with C.A.A. specifications. The free aperture of the right barrel was 25% below the specified value and the resolution in both barrels was somewhat outside the specification limit. The binoculars, however, appeared to be satisfactory for ordinary use.



<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
21A-5/53	4-3-53	8-6-53	\$175.	Fy 53 - \$144. Fy 51 - \$115.

This test, which was carried over from the previous year, covers three lots of neon approach-light lamps. The first two lots were unsatisfactory for operating voltage and the third lot was considerably below the specified limit for light output.

21A-6/53	5-14-53	8-17-53	\$175.	\$165.
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Three sample transformers for approach-light units were tested for compliance with the requirements of the C.A.A. specification. The inspection revealed five deficiencies with respect to the specifications, but only one of these, a low power-factor, was considered serious.

21A-10/53	11-3-53	(in progress)	\$375.	\$310.
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Fifteen approach-light photometers were inspected and calibrated. These instruments were found to have incorrect test-plate orifices which had to be returned to the manufacturer for enlargement. Upon being returned they were reinstalled in the instruments before calibration could be made. Some difficulties were also experienced in checking additional photometers which were returned to this bureau from the C.A.A. and the National Airport. In one case a new calibration lamp had to be installed in the calibrator. After these difficulties had been overcome the tests proceeded satisfactorily. The units were calibrated, calibration cards were prepared, the cards were sealed into plastic covers and installed in the instrument cases and the instruments were packed and shipped on bills of lading furnished by the C.A.A.

213-6-54	1-6-54	2-2-54	--	\$270.
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Two transformers designed for direct earth burial were tested for compliance with the requirements of the C.A.A. specification. One was taken apart and inspected for construction and found satisfactory. The other transformer was tested for electrical characteristics before and after being dropped to simulate the effects of rough handling. All previous tests were then repeated. The transformers were found to be in accordance with specifications.

The following flight plan for instrument trouble signal testing was developed and submitted to the Bureau of Navigation. After being given the go-ahead, the crew flew over the station which is located at University Park, D.C. A test was made at each of the stations along the route, with the intent of test each time the signals were disrupted with the radio.



## 5. RESEARCH, CONSULTATION AND LIAISON SERVICES

### 5.1 Study of exposure characteristics of metal protective coatings

This study embraces the characteristics of 16 coating sequences applied to corrugated steel panels, used to simulate old structures, and 10 sequences applied to galvanized steel panels, simulating new work, to determine the relative corrosion protective value of the different treatments. The corrugated panels were brushed to remove loose rust. The galvanized steel panels were given priming coats comprised of zinc dust and zinc oxide and two coats of orange exterior enamel followed by 2000 hours in an accelerated weathering equipment before being treated with the other coatings. Both natural and accelerated weathering is being used on the completed panels. In December, a progress report was submitted covering the loss of gloss and color changes for the different specimens. At the time the progress report was prepared only one of the coating systems had proven inferior to the others in protective value, although there was considerable difference in the loss of gloss. Up to that time, the study had not revealed a satisfactory correlation between the results obtained from the outdoor exposures and those resulting from the use of the accelerated weathering equipment. The test is being continued.

Cost: \$640. \*

### 5.2 Study of green plastic for beacon covers

During the previous year, various samples of green plastic were tested for chromaticity until a satisfactory sample was found. On the basis of this sample, some experimental green plastic covers for 2½" beacons were purchased by the C.I.A. and one of these was sent to this Bureau. In order to obtain information on the exposure characteristics to be expected from this plastic, a 3" disc was cut from the center of this cover and the resulting hole was filled with a piece of clear plastic. This beacon cover was returned to the C.I.A. for service tests and the small sample was spectrophotometered to determine its chromaticity. Subsequently, this disc was given four 120-hour exposures to spray and ultraviolet radiation. After each exposure the sample was again spectrophotometered and its chromaticity has been computed for each stage. The results appear very stable but the report has not as yet been prepared.

Cost: \$115.

### 5.3 Study of optical system for traffic control projectors

In the previous fiscal year an experimental traffic signal projector was submitted for candlepower distribution measurements. After making these measurements, it was found that the device could be improved by rotating the lamp to make a more satisfactory use of the filament form. Upon completion of this work the results were discussed with the C.I.A.

\* Costs stated are for the report period.

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achieved and it has led to a more favorable view of the possibilities of developing the political system and its influence on the outcome of the election. This view is shared by the majority of the population of the country and by members of the traditional party. The new party has succeeded, and this has been due to the promotion of the principles of social justice. This has been achieved through the education of the people, through their participation in the political process, and through their involvement in the development of the economy. This has been achieved through the promotion of the principles of social justice, which have been adopted by the government and the opposition. This has been achieved through the promotion of the principles of social justice, which have been adopted by the government and the opposition.

Costs: \$100.

### 2.4. Modernization of the Economy

During the previous fiscal year a final report of a joint investigation by experts from the United Nations and the World Bank was submitted to the government. This report recommended a number of measures to be taken to modernize the economy. These measures included a reduction in the status of the central bank, which was considered to be too powerful and too influential. However, it was noted that these actions were not taken, and as a result, the economy did not improve. The report also recommended that the government should increase its investment in infrastructure, particularly in transportation and communications, and that it should encourage foreign investment. These recommendations were not fully implemented, and as a result, the economy did not improve from the previous year. The government's failure to take full advantage of this opportunity has been widely criticized, and there has been a growing demand for greater accountability and transparency in the management of the economy. This will be further discussed in a later section of the report.

Costs: \$100.

### 2.5. Implementation of the Economic Strategy

This fiscal year has seen an increasing emphasis on the implementation of the economic strategy outlined in the report of the previous year. This has been achieved through the introduction of a number of new policies, such as the introduction of a new tax system, the introduction of a new currency, and the introduction of a new financial system. These changes have been implemented in a timely manner, and they have been well received by the public. The government's commitment to the implementation of the economic strategy has been widely praised, and there has been a growing sense of optimism about the future of the economy.

Costs: \$100.

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Financial Summary, July 1, 1953 to February 26, 1954  
 C.A.A. Fund No. 1311330.601

N.S.R. Project 6201-30-2322

Transfer by C.A.A. Order CA-5b-274 \$6000.

Cost of tests performed

C.A.A. No.	Date of request	Item Tested *	Costs to date
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"Government Tests"

CA3593	6-16-53	"Go-Sludge"	\$ 100
CA3607	?	Propeller	Canceled
CA4096	9-11-53	Field Intensity Meter	306
CA4807	1-6-54	Lamp holders for approach lights	— ee
CA4868	1-6-54	PAR Lamp connectors	27 ee
CA4950	1-15-54	Frequency meter	6
CA4952	1-27-54	Cable clamp	— ee

"Project Tests"

22-1-5b	12-6-53	Hemispherical Neon lamps for approach lights	155
21-1-5/53	4-3-53	Transformers for approach lights	115
21-1-8/53	5-14-53	Approach-light phot- ometers (Report pending)	465
21-1-10/53	11-3-53		610
		Total for tests	\$ 215.

Research, Consultation and Liaison Services

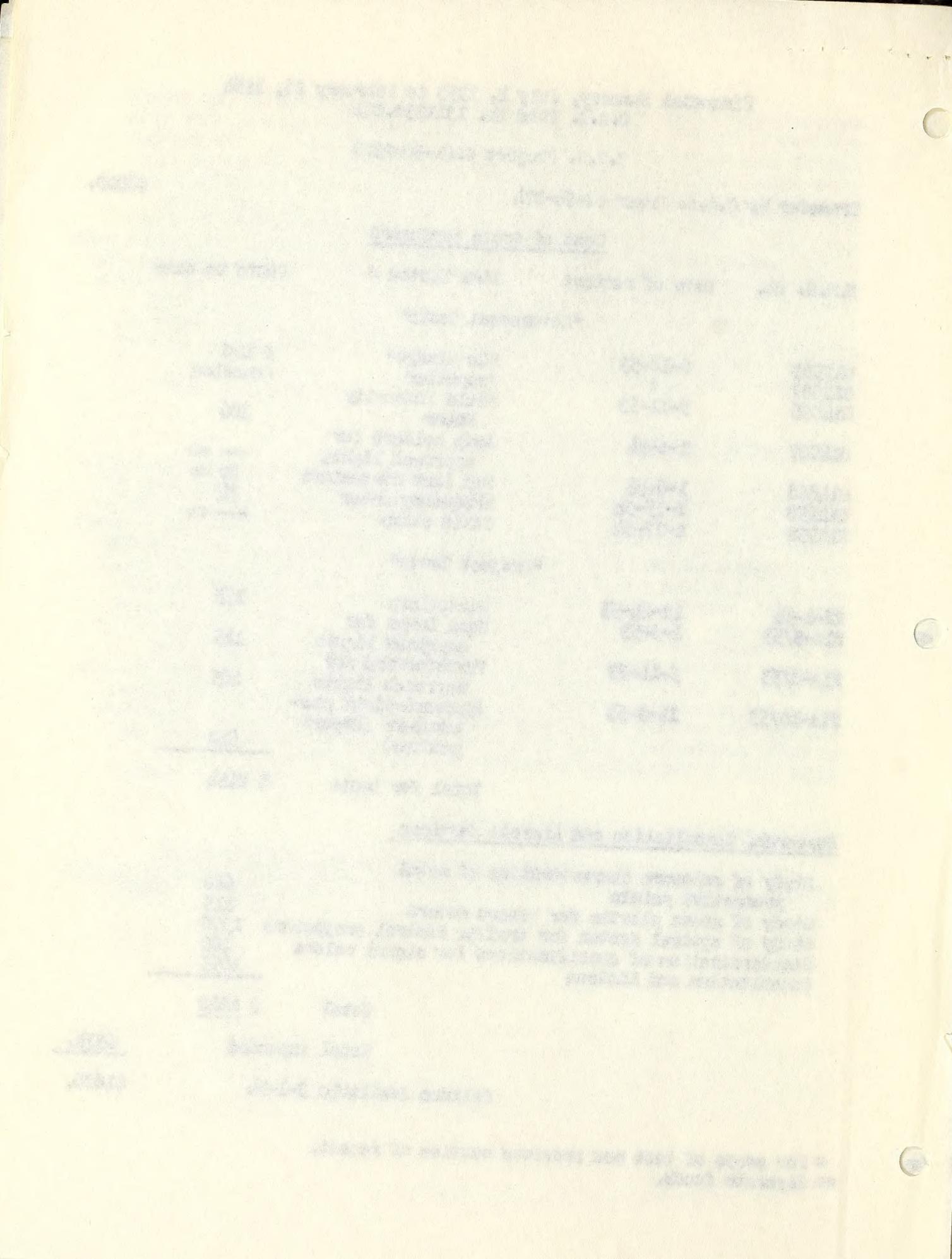
Study of exposure characteristics of metal protective paints	600
Study of green plastic for beacon covers	115
Study of optical system for traffic control projectors	1370
Standardization of specifications for signal colors	150
Consultation and Liaison	1055

Total \$ 1220

Total expended \$ 1176.

Balance available 3-1-54 \$1526.

\* For scope of test see previous section of report.  
 \*\* Separate funds.



Financial Summary, July 1, 1953 to February 28, 1954  
C.I.A. Fund No. 1301305.001

N.B.S. Projects 6201-30-2303  
and 37-8

Carry over from fiscal year 1953 (6453-733 Amendment 2)  
(Reduced free balance stated in last report by accruals  
of obligations of prior year in the amount of \$1.50) \$2995.37

Cost of Test Performed

Number	Date of request	Item Tested	Cost
323-6-51	1-6-54	Direct burial transformers	\$270

Research, Consultation and Liaison Services

Liaison activities	<u>64</u> 336
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Balance Available 3-1-54 \$2659.

11

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